Prince William County

Phase III Chesapeake Bay TMDL Action Plan

Virginia Stormwater Management Program (VSMP)
Municipal Separate Storm Sewer System (MS4) Permit No. VA0088595

June 30, 2026 – Draft

Environmental Management Division
Prince William County Department of Public Works
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Prince William, VA 22192

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Benjamin Eib	**Sr. Environmental Program Mgr.**	6/30/26
Benjamin Eib	Title	Date

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1. Introduction

1.1 Purpose

This Draft Phase III Chesapeake Bay TMDL Action Plan (Action Plan) builds on Prince William County's initial Chesapeake Bay TMDL Action Plan approved by the Virginia Department of Environmental Quality (DEQ) on June 28, 2017. This Action Plan documents how the County intends to meet the "Chesapeake Bay TMDL Special Condition" in Section I.D.1 of the Municipal Separate Storm Sewer System Permit No. VA0088595 (MS4 Permit) issued December 17, 2014. The County is required to document the means and methods that will be utilized to meet the required reductions of specific Pollutants of Concern (POCs) allocated in the Special Condition of the Commonwealth of Virginia's Phase I and II Chesapeake Bay Total Maximum Daily Load (TMDL) Watershed Implementation Plans (WIPs).

These reductions are based on the Level 2 (L2) scoping run of the Chesapeake Bay Watershed Model for existing developed lands (pervious and impervious regulated urban lands developed prior to July 1, 2009). Level 2 implementation equates to an average reduction of 9% of nitrogen loads, 16% of phosphorous loads, and 20% of sediment loads from impervious regulated areas and 6% of nitrogen loads, 7.25% of phosphorous loads, and 8.75% of sediment loads from pervious regulated acres beyond the 2009 progress run loadings. As part of this effort, Virginia Department of Environmental Quality (VADEQ) has committed to a phased approach for MS4 permittees to implement necessary reductions. Permittees will have up to three, five-year permit cycles to achieve required reductions. The County's first permit cycle (December 17, 2014 – December 16, 2019) represents implementation of 5% of the L2 as specified in the 2010 Phase I WIP. The second permit cycle will require an additional 35% of total L2 reductions (40% cumulative), while the third permit cycle will require implementation of the remaining 60% of reductions (100% cumulative).

This Action Plan documents how the County plans to implement the third permit cycle reduction of 60% for a cumulative total reduction of 100% by June 30, 2028.

2. Current Program and Legal Authority

Prince William County has determined through a review of its program plan and associated ordinance, that it currently holds sufficient legal authority to ensure compliance with the MS4 Permit. The following section briefly describes these authorities, and their relationship to permit compliance.

2.1 Program Plan

The County has completed an MS4 Program Plan (Program Plan) that documents the implementation of all MS4 Permit requirements, including the programmatic and legal authorities required to meet the Chesapeake Bay Special Condition (Section I.D.1). The full Program Plan can be accessed from the following link: Community MS4 Program

Prince William County's Program Plan outlines the specific BMPs that the County is implementing in order to meet requirements set forth in its MS4 Permit and the associated Chesapeake Bay Special Condition.

2.2 Existing Legal Authority

The following legal authorities enable Prince William County to comply with the Chesapeake Bay TMDL Special Condition. These legal authorities are referenced in the County's Program Plan and are included here for additional reference.
- Stormwater Management Ordinance – Prince William County Code Chapter 23.2
- Solid Waste Ordinance - Prince William County Code Chapter 22.0
- Water Supply System Ordinance - DCSM SECTION 400
- Erosion and Sediment Control Ordinance – DCSM SECTION 700
- Fire Prevention Ordinance – Prince William County Code Chapter 9.2
- Sewers and Sewage Disposal Ordinance - Prince William County Code Chapter 23.0

2.3 New or Modified Legal Authority

As described in subsection 2.2 above, the existing authority is sufficient for compliance with this Special Condition. There is no need for new or modified legal authority beyond what is described in the section above. As the County reaches its third permit phase, an assessment of potential new or modified legal authority will be made. All updates will be reflected in future iterations of this document, as well as in the County's Program Plan.

3. Estimated Existing Source Loads and Calculated Total Pollutant of Concern (POC) Required Reductions

3.1 MS4 Regulated Area

The existing POC source loads from Prince William County have been estimated by means of comprehensive GIS-based desktop analysis. Utilizing the County's extensive stormwater inventory and a specifically developed MS4 Delineation and Stormwater Tool, the County's regulated outfalls and associated drainage areas were identified. Included in the analysis was information on the ownership and operation of regulated outfalls, pipe networks, and SWM/BMP facilities, along with a determination of impervious surface acres in the County.

In order to determine the 2009 impervious area, the County's 2012 impervious area assessment was used as a base, as this was the best data available. Using ortho-rectified aerial photography dated 2009, an impervious data layer was created by identifying areas throughout the County that were undeveloped as of June 30, 2009. This was largely accomplished using the aerial photography but also included an inventory of land development projects initiated throughout Prince William County after the first permit cycle 2009 progress run deadline as well as specific as-built plans and plats when necessary. Included in the impervious surface determination are structures, bridges,

roadways, driveways, alleyways, paved medians, parking lots, sidewalks, and hard surface sports courts, as well as large patio surfaces that may include swimming pools.

Data pertaining to outfalls, pipe networks, and SWM/BMP facilities are continuously updated and maintained by the County's GIS department. These structures were imported into the Stormwater Delineation tool and are included in the assessment of the County's MS4 service area. The Stormwater Tool will update the attribute data for each outfall to include a unique ID, its latitude and longitude in decimal degrees, the local watershed (WTRSHD_ID), the 5th and 6th order VA HUC, the HUC12, and the waterbody receiving outflow (listed as a REACHCODE). Outfalls also contain ownership and maintenance responsibility information.

Once the initial MS4 service area was identified, excluded areas as outlined in the TMDL Action Plan Guidance Document (Section II.2) were removed. This included land regulated under any general VPDES permitted facility, lands regulated under an individual VPDES permit, forested lands, agricultural lands, wetlands and open waters. Refer to Appendix A for a map of the County's 2009 MS4 service area.

3.2 Existing Source Loads

An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009 is provided below in Table 1. This estimate is based on the 2009 Chesapeake Bay Model progress run and is consistent with Table 1a and 1b of the County's MS4 Permit.

Table 1a – Calculation Sheet for Estimating Existing Source Loads and Reduction Requirements for the Potomac River Basin Through (June 30, 2026)

Pollutant	Subsource	Loading Rate (lbs/ac/yr)	Existing developed lands as of 6/30/09 served by the MS4 within the regulated area (acres)	Loads (lbs/yr)	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by June 30, 2026	40% cumulative reduction required by June 30, 2026 (lbs/yr)	Sum of 40% cumulative reduction (lb/yr)
Nitrogen	Regulated Urban Impervious	16.86	6,626.78	111,727.51	9%	40%	4,022.19	8,017.36
	Regulated Urban Pervious	10.07	16,530.83	166,465.46	6%	40%	3,995.17	
Phosphorous	Regulated Urban Impervious	1.62	6,626.78	10,735.38	16%	40%	687.06	883.62
	Regulated Urban Pervious	0.41	16,530.83	6,777.64	7.25%	40%	196.55	

Table 1b – Calculation Sheet for Estimating Existing Source Loads and Reduction

Pollutant	Subsource	Loading Rate (lbs/ac/yr)	Existing developed lands as of 6/30/09 served by the MS4 within the regulated area (acres)	Loads (lbs/yr)	Percentage of MS4 required Chesapeake Bay total L2 loading reduction	Percentage of L2 required reduction by June 30, 2028	100% cumulative reduction required by June 30, 2028 (lbs/yr)	Sum of 100% cumulative reduction (lb/yr)
Nitrogen	Regulated Urban Impervious	16.86	6,626.78	111,727.51	9%	100%	10,055.48	
	Regulated Urban Pervious	10.07	16,530.83	166,465.46	6%	100%	9,987.93	20,043.40
Phosphorous	Regulated Urban Impervious	1.62	6,626.78	10,735.38	16%	100%	1,717.66	
	Regulated Urban Pervious	0.41	16,530.83	6,777.64	7.25%	100.00%	491.38	2,209.04

3.3 Required Reductions

Table 2 computes the required POC reductions for each permit cycle and identifies the 100% POC reductions required by June 30, 2028.

Table 2 – Reduction Required per Permit Phase

Pollutant	1st Phase (5%)	2nd Phase (35%)	3rd Phase (60%)	Total (100%)
Nitrogen	1,002.17	7,015.19	12,026.04	**20,043.40**
Phosphorous	110.45	773.15	1,325.40	**2,209.00**

3.4 Reductions Achieved

Table 3 shows the total reductions the County has achieved to date. Appendix B shows a comprehensive list of projects completed to date, which includes total reductions for each project.

Table 3 – Total Reductions Achieved To Date

Pollutant	Required 100% cumulative reduction (lbs/yr)	Reductions achieved to date (lbs/yr)	Percent reduction achieved to date
Nitrogen	20,043.40	10,806.00	54%
Phosphorous	2,209.04	2,934.00	133%

4. Means and Methods to Meet Required Reductions and Schedule

Prince William County has a comprehensive watershed improvement program, which aims to improve water quality through the implementation of water quality improvement projects such as stormwater facility retrofits, stream restorations, and reforestation projects. The primary means and methods planned for this permit cycle include the implementation of stormwater facility retrofits, stream restorations, and reforestation projects.

4.1 BMPs Planned for the Third Permit Phase

This section outlines the County's planned reductions for the third permit phase through the implementation of stream restoration and stormwater retrofit projects. Table 4 summarizes the POC reductions by project.

Table 4 - POC Reductions for 3rd Permit Phase by Type

Project Status	Project Name	Reduction TN	Reduction TP
Phase III Planned	Upper Dewey's Phase 1	5,556	627
	Upper Dewey's Phase 2 (1C)	2,542	414
	Middle Dewey's Phase 1	746	276
	SWM Facility #416 Retrofit	373	40
	Lake Drive Stream Restoration	28	25
	SWM Facility #602 Retrofit	93	21
	Total	**9,338**	**1,403**

Four stream restoration projects are planned during the third permit phase. The load reductions associated with each planned stream restoration project have been computed in accordance with Appendix V.J. of the Chesapeake Bay TMDL Special Condition Guidance. Appendix C includes details on each project including the implementation schedule, location, restoration length and pollutant reductions. Appendix D includes the reduction calculation worksheets for each project.

The County plans to implement two stormwater retrofits during the third permit phase. The estimated load reductions for planned projects have been calculated in accordance with Appendix V.D. of the Chesapeake Bay TMDL Special Condition Guidance. Appendix C provides more details on each project identified in this plan including the implementation schedule, location, practice type, treatment area and pollutant reductions. Appendix D includes the reduction calculation worksheets for each project.

The details, extent, and timing of planned projects may change at the discretion of the County. Updates will be provided in each annual report.

4.2 Additional Means and Methods

The County reserves the right to implement and take credit for additional creditable facilities or practices as provided for in the Chesapeake Bay TMDL Special Condition Guidance, such as credit for redevelopment, septic conversions, off-site pollutant reduction credits, and nutrient management plans not required under the MS4 permit. The guidance document specifically references the work of the Chesapeake Bay Urban Stormwater Workgroup, which includes credits for street sweeping, urban nutrient management and homeowner best management practices such as rainwater harvesting, downspout disconnection, permeable hard-scapes, tree planting, and impervious cover removal. Reductions achieved will be documented to DEQ in the annual reports.

4.3 Compliance Summary

Table 5 demonstrates how the County will meet the required reductions for each POC with the implementation of BMP's described in the above sections.

Table 5 - Compliance Summary

Pollutant	Required 100% cumulative reduction (lbs/yr)	Reductions achieved to date (lbs/yr)	Percent reduction achieved to date	Planned Reductions (lbs/yr)	Total percent reduction achieved with this Action Plan
Nitrogen	20,043.40	10,806.00	54%	9,338	101%
Phosphorous	2,209.04	2,934.00	133%	1,403	196%

As shown in Table 5, the planned load reductions for the third permit phase are projected to meet all POC's.

5. All Structural Facilities (Regulatory and Non-Regulatory) Between January 1, 2006 and June 30, 2009

The documentation associated with this requirement was addressed in the initial Action Plan.

6. Means and Methods to Offset Increased Loads from New Sources Initiating Construction Between July 1, 2009 and June 30, 2014

The documentation associated with this requirement was addressed in the initial Action Plan.

7. Means and Methods to Offset Increased Loads from Grandfathered Projects Beginning Construction After July 1, 2014

The documentation associated with this requirement was addressed in the initial Action Plan.

8. List of Future Projects Qualifying as Grandfathered

The documentation associated with this requirement was addressed in the initial Action Plan.

9. Estimate of the Expected Cost to Implement the Necessary Reductions

Refer to Appendix E for the estimated costs for each project including the costs for planning, design, and construction of each project. The estimates are based on currently available cost information and may change during the permit cycle but will be updated with each subsequent Annual Report.

Appendix A – MS-4 Service Area Delineation Map

PRINCE WILLIAM COUNTY MS4 SERVICE AREAS

LOUDOUN COUNTY

FAIRFAX CITY

FAIRFAX COUNTY

FAUQUIER COUNTY

STAFFORD COUNTY

HAYMARKET

MANASSAS PARK

MANASSAS CITY

OCCOQUAN

DUMFRIES

QUANTICO

MERRIFIELD GARDEN WAY

LINTON HALL ROAD

SUDLEY MANOR DRIVE

WELLINGTON ROAD

LIBERIA AVENUE

HOADLY ROAD

SPRIGGS ROAD

MINNIEVILLE ROAD

SMOKETOWN ROAD

TELEGRAPH ROAD

GORDON BOULEVARD

DALE BOULEVARD

CARDINAL DRIVE

NEABSCO MILLS ROAD

NEABSCO CREEK

POWELLS CREEK

Quantico Creek

Belmont Bay

Occoquan Bay

Potomac River

234 15 66 55 29 4357 6 649 28 294 95 1

N W E S

Miles

0 1 2 3 4

PWC MS4 Service Area

Cities

County Boundary

Waterbody

Roadways

Collector

Secondary

Primary

Interstate

Prince William County
Virginia

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Appendix B – Summary of Completed Projects

Project Name	BMP Type	Installation FY	TN	TP
Historical Credits	Historic	2009	4,595	430
SWM Facility #257	SWM Retrofit	2010	6	0
Cow Branch Phase I	Stream Restoration	2011	66	60
Innovation - Area 1D	Land Use Change	2011	1	0
Pond 51 - Hammill Mill Park SWMF	SWM Retrofit	2011	10	1
SWM Facility #154 - Dawson Ridge	SWM Retrofit	2011	10	1
SWM Facility #157 - Dawson Ridge	SWM Retrofit	2011	7	0
Ben Lomond Park Area A	Land Use Change	2012	1	0
Cow Branch Phase II	Stream Restoration	2012	44	40
Ben Lomond Park Area B	Land Use Change	2013	23	1
Ben Lomond Park Area C	Land Use Change	2013	1	0
Deerfield Estates	Stream Restoration	2013	14	13
Northgate	Stream Restoration	2013	19	17
SWM Facility #318	SWM Retrofit	2013	25	1
SWM Facility #363	SWM Retrofit	2013	50	2
SWM Facility #494	SWM Retrofit	2013	82	12
Sudley Place Reforestation	Land Use Change	2014	19	1
SWM Facility #505	SWM Retrofit	2014	24	1
SWM Facility #77	SWM Retrofit	2014	61	2
Ben Lomond Park Area D	Land Use Change	2015	1	0
Cow Branch Phase III	Stream Restoration	2015	39	35
Hope Hill Crossing	Land Use Change	2015	31	2
Oak Street	Stream Restoration	2015	13	12
SWM Facility #98	SWM Retrofit	2015	12	1
SWM Facility #99	SWM Retrofit	2015	27	3
Garner Drive	Land Use Change	2016	2	0
Hunter Ridge Estates Area A	Land Use Change	2016	34	2
Hylbrook Park	Stream Restoration	2016	81	73
Leesylvania Living Shoreline 1	Living Shoreline	2016	44	3
Bristoe Station Battlefield Phase 1	Land Use Change	2017	85	5
Dewey's Creek Reach 4	Stream Restoration	2017	34	31
East Longview - Route 1 Restoration	Stream Restoration	2017	23	51
Hunter Ridge Estates Area B	Land Use Change	2017	29	2
Reach 5	Stream Restoration	2017	147	142
SWM Facility #28	SWM Retrofit	2017	52	4
Bristoe Station Battlefield Phase 2	Land Use Change	2018	27	1
Dewey's Creek Reach 1	Stream Restoration	2018	479	232
SWM Facility #109	SWM Retrofit	2018	136	10
SWM Facility #147	SWM Retrofit	2018	54	5
SWM Facility #489	SWM Retrofit	2018	129	7
Dewey's Creek Reach 2 & 3	Stream Restoration	2020	1,953	1,049
SWM Facility #424	SWM Retrofit	2020	185	27
Bristoe Station Battlefield Phase 3	Land Use Change	2021	62	3
SWM Facility #232	SWM Retrofit	2021	40	4
Powells Creek Phase 1	Stream Restoration	2022	377	174
SWM Facility #386	SWM Retrofit	2022	54	8
Powells Creek Phase 2	Stream Restoration	2024	509	246
Chinn Park SWM	SWM Retrofit	2025	329	27
Chinn Park Stream	Stream Restoration	2025	307	85
		TOTALS	**10,357**	**2,825**

Appendix C – Summary of Planned Projects

Project Name	Ph3 Action Plan	CIP	Magisterial District	Watershed	Project Type	Project Phase	Implementation FY	Cost	Cost/lb TN	Latitude	Longitude	Reduction TN	Reduction TP
SWM Facility #416 Retrofit	Yes	Yes	Coles	Bull Run	Retrofit	Design	2027	$850,000	$3,277	38.75104	-77.43079	373	40
Lake Drive Outfall Restoration	Yes	Yes	Coles	Bull Run	Stream	Design	2027	$850,000	$22,667	38.78564	-77.43458	28	25
Upper Dewey's Phase 1	Yes	Yes	Potomac	Quantico	Stream	Design	2027	$9,957,400	$1,792	38.58544	-77.32656	5,556	627
SWM Facility #602 Retrofit	Yes	Yes	Brentsville	Broad Run	Retrofit	Design	2027	$890,000	$9,570	38.73858	-77.57366	93	21
Middle Dewey's Phase 1	Yes	Yes	Potomac	Quantico	Stream	Design	2027	$6,244,800	$8,371	38.57996	-77.31724	746	276
Upper Dewey's Phase 2	Yes	Yes	Potomac	Quantico	Stream	Concept	2028	$5,034,400	$906	38.58751	-77.32289	2,542	414

Appendix D – POC Reduction Calculation Worksheets

SWM Facility #416 **Constructed Wetland L1**

1 Determine existing published efficency

BMP Type	Source	TN	TP	TSS
Dry Detention Pond	CBP	5%	10%	10%

2 Apply downward modification to BMP Efficiency

Facilty Name	BMP Type	Lat	Long	Modification Type	Downward Modification Applied
SWM Facility #416	Dry Detention Pond	38.75104	-77.43079	No sediment forebay	-10%
				Short circuting	-10%
				No micropool	-10%
				Total	**-30%**

3 Calculate modified existing efficiency

		TN	TP	TSS
Published Efficiency	Step 1	5%	10%	10%
Efficiency Modification	Step 2	-30%	-30%	-30%
Modified Efficiency		**3.50%**	**7.00%**	**7.00%**

4 Determine efficiency of proposed BMP Type

Source	BMP Type	TN	TP	TSS
CBP Retrofit Equations	Constructed Wetland L1	32.78%	51.50%	65.55%

Runoff storage (acre-feet)	2.26
Impervious acres	33.23
Runoff depth	**0.82**

Retrofit Equation Results

TN	32.78%
TP	51.50%
TSS	65.55%

5 Calculate Incremental Removal Rate

		TN	TP	TSS	
Removal Rate	Constructed Wetland L1	32.78%	51.50%	65.55%	CBP Retrofit Equations
Modified existing efficieny	Step 3	3.50%	7.00%	7.00%	
Incremental Removal Rate		**29.28%**	**44.50%**	**58.55%**	

6 Calculate Load Reduction

6a Characterize the Drainage Area

	Urban Impervious Acres	Pervious Acres	Forested Acres	Total
PWC Regulated Land	0.00	0.00	0.00	0.00
Other Regulated Land	33.39	44.31	6.02	83.72
Unregulated Land	12.19	10.65	25.71	48.55
	45.58	**54.96**	**31.73**	**132.27**

6b Account for Total Baseline Reductions on Unregulated Land

	POC	Required 5% Load Reductions	Baseline Loading Rate (*20)	Acres	Baseline Reduction
Unregulated Impervious	TN	0.07587000	1.51740000	12.19	18.50
Unregulated Pervious	TN	0.03021000	0.60420000	10.65	6.43
Unregulated Impervious	TP	0.01296000	0.25920000	12.19	3.16
Unregulated Pervious	TP	0.00148625	0.02972500	10.65	0.32
Unregulated Impervious	TSS	11.71320000	234.26400000	12.19	2,855.68
Unregulated Pervious	TSS	0.76912500	15.38250000	10.65	163.82

6c Calculate Total Load Reduction

Land Use	Pollutant	2009 EOS Loading Rate (lbs/acre/yr)	DA	Load	Efficiency	Initial Reduction	Baseline	Total Reduction	Sub-total/POC
Urban Impervious	Nitgrogen	16.86	45.58	768.48	29.28%	224.98	18.50	206.48	
Urban Pervious	Nitgrogen	10.07	54.96	553.45	29.28%	162.03	6.43	155.59	**372.85**
Forest	Nitgrogen	1.16	31.73	36.81	29.28%	10.78	0.00	10.78	
Urban Impervious	Phosphorus	1.62	45.58	73.84	44.50%	32.86	3.16	29.70	
Urban Pervious	Phosphorus	0.41	54.96	22.53	44.50%	10.03	0.32	9.71	**40.40**
Forest	Phosphorus	0.07	31.73	2.22	44.50%	0.99	0.00	0.99	
Urban Impervious	Total Suspended Solids	1,171.32	45.58	53,388.77	58.55%	31,261.49	2,855.68	28,405.82	
Urban Pervious	Total Suspended Solids	175.80	54.96	9,661.97	58.55%	5,657.51	163.82	5,493.69	**34,968.56**
Forest	Total Suspended Solids	57.54	31.73	1,825.74	58.55%	1,069.05	0.00	1,069.05	

7 Reduction Summary Table

Project Name	BMP Type	Lat	Long	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
SWM Facility #416	Constructed Wetland L1	38.75104	-77.43079	372.85	40.40	34,968.56

Lake Drive Outfall Restoration **Stream Restoration** **Status: Design**

500 **Crediting: Initial Estimate**

1 Calculate POC Reductions

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
Interim Removal Rates (lbs/lf)	0.075	0.068	44.88
Restoration Length (lf)	500	500	500
Initial POC Reductions	**37.50**	**34.00**	**22,440.00**

2 Characterize the Drainage Area

	Urban Impervious Acres	Urban Pervious Acres	Forested Acres	Total Urban Acres	Total Acres
PW Regulated Land	45.12	28.26	5.38	73.38	78.76
Other Regulated Land	98.16	18.61	6.77	116.77	123.53
Total Regulated Land	143.28	46.87	12.15	190.15	202.29
Total Unregulated Land	65.63	37.08	81.54	102.71	184.25
	208.90	**83.95**	**93.68**	**292.85**	**386.54**

3 Compute Ratios and Calculate Proportional Reductions by Land Use

	Regulated Area	Unregulated Area	Forested Acres	Total Credit
Ratio	**49.19%**	**26.57%**	**24.24%**	
TN (lbs) Reduction	18.45	9.96	9.09	**37.50**
TP (lbs) Reduction	16.73	9.03	8.24	**34.00**
TSS (lbs) Reduction	11,038.70	5,962.56	5,438.74	**22,440.00**

Total Check
100.00%

4 Account for Total Baseline Reductions on Unregulated Land

Urban Land Use	POC	Required 5% Load Reductions (lbs/acre/yr)	Baseline Loading Rate (*20)	Acres	Baseline Reduction (lbs/yr)
Impervious	TN	0.07587000	1.51740000	65.63	99.58
Pervious	TN	0.03021000	0.60420000	37.08	22.40
Impervious	TP	0.01296000	0.25920000	65.63	17.01
Pervious	TP	0.00148625	0.02972500	37.08	1.10
Impervious	TSS	11.71320000	234.26400000	65.63	15,373.58
Pervious	TSS	0.76912500	15.38250000	37.08	570.41

5 Calculate Total Reductions Minus Required Baseline

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
Credit for Unregulated Areas	9.96	9.03	5,962.56
Minus Unregulated Impervious Baseline	99.58	17.01	15,373.58
Minus Unregulated Pervious Baseline	22.40	1.10	570.41
Credit for Unregulated Areas	0.00	0.00	0.00
Credit for Regulated Areas	18.45	16.73	11,038.70
Credit for Forested Areas	9.09	8.24	5,438.74
Total Reductions Claimed	**27.54**	**24.97**	**16,477.44**

6 Reduction Summary Table

Project Name	BMP Type	Lat	Long	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
Lake Drive Outfall Restoration	Stream Restoration	38.7855086	-77.4333617	27.54	24.97	16,477.44

Upper Dewey's 1	Stream Restoration	Status: Design
6,226	Reaches 3B & 4	Crediting: Protocols Used

1 Calculate POC Reductions

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal	
100% Load Reduction Estimates (lbs/yr)	6,696.0	758.0	2,823,916.0	
Percent Efficiency		0.85		<- Estimate to be updated after 1st monitoring yr
Initial POC Reductions	**5,691.60**	**644.30**	**2,400,328.60**	

2 Characterize the Drainage Area

	Urban Impervious Acres	Urban Pervious Acres	Forested Acres	Total Urban Acres	Total Acres
PW Regulated Land	26.49	27.46	2.31	53.95	56.26
Other Regulated Land	22.53	6.26	8.64	28.79	37.43
Total Regulated Land	49.02	33.72	10.95	82.74	93.69
Total Unregulated Land	60.05	74.12	243.44	134.17	377.61
	109.07	**107.84**	**254.39**	**216.91**	**471.30**

3 Compute Ratios and Calculate Proportional Reductions by Land Use

	Regulated Area	Unregulated Area	Forested Acres	Total Credit	Total Check
Ratio	**17.56%**	**28.47%**	**53.98%**		100.00%
TN (lbs) Reduction	999.20	1,620.29	3,072.11	**5,691.60**	
TP (lbs) Reduction	113.11	183.42	347.77	**644.30**	
TSS (lbs) Reduction	421,394.42	683,327.16	1,295,607.03	**2,400,328.60**	

4 Account for Total Baseline Reductions on Unregulated Land

Urban Land Use	POC	Required 5% Load Reductions (lbs/acre/yr)	Baseline Loading Rate (*20)	Acres	Baseline Reduction (lbs/yr)
Impervious	TN	0.07587000	1.51740000	60.05	91.12
Pervious	TN	0.03021000	0.60420000	74.12	44.78
Impervious	TP	0.01296000	0.25920000	60.05	15.56
Pervious	TP	0.00148625	0.02972500	74.12	2.20
Impervious	TSS	11.71320000	234.26400000	60.05	14,067.55
Pervious	TSS	0.76912500	15.38250000	74.12	1,140.15

5 Calculate Total Reductions Minus Required Baseline

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
Credit for Unregulated Areas	1,620.29	183.42	683,327.16
Minus Unregulated Impervious Baseline	91.12	15.56	14,067.55
Minus Unregulated Pervious Baseline	44.78	2.20	1,140.15
Credit for Unregulated Areas	1,484.39	165.65	668,119.45
Credit for Regulated Areas	999.20	113.11	421,394.42
Credit for Forested Areas	3,072.11	347.77	1,295,607.03
Total Reductions Claimed	**5,555.70**	**626.53**	**2,385,120.90**

6 Reduction Summary Table

Project Name	BMP Type	Lat	Long	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
Upper Dewey's 1	Stream Restoration	38.58544	-77.32656	5,555.70	626.53	2,385,120.90

SWM Facility #602 **Wet Pond, L1**

1 Determine existing published efficency

BMP Type	Source	TN	TP	TSS
Extended Dry Detention Pond	CBP	20%	20%	20%

2 Apply downward modification to BMP Efficiency

Facilty Name	BMP Type	Lat	Long	Modification Type	Downward Modification Applied
SWM Facility #602	Dry Detention Pond			No sediment forebay	-10%
				Short circuiting	-10%
				No micropool	-10%
				Total	**-30%**

3 Calculate modified existing efficiency

		TN	TP	TSS
Published Efficiency	Step 1	20%	20%	20%
Efficiency Modification	Step 2	-30%	-30%	-30%
Modified Efficiency		**14.00%**	**14.00%**	**14.00%**

4 Determine efficiency of proposed BMP Type

Source	BMP Type	TN	TP	TSS
BMP Clearinghouse	Wet Pond, L1	25.00%	50.00%	60.00%

Runoff storage (acre-feet)	
Impervious acres	27.24
Runoff depth	**0.00**

Retrofit Equation Results	
TN	-0.46%
TP	-0.72%
TSS	-0.91%

5 Calculate Incremental Removal Rate

		TN	TP	TSS	
Removal Rate	Wet Pond, L1	25.00%	50.00%	60.00%	BMP Clearinghouse
Modified existing efficieny	Step 3	14.00%	14.00%	14.00%	
Incremental Removal Rate		**11.00%**	**36.00%**	**46.00%**	

6 Calculate Load Reduction

6a Characterize the Drainage Area

	Urban Impervious Acres	Pervious Acres	Forested Acres	Total
PWC Regulated Land	27.23	32.47	5.89	65.59
Other Regulated Land	0.00	0.00	0.00	0.00
Unregulated Land	0.01	0.82	4.17	5.00
	27.2400	**33.29**	**10.06**	**70.59**

6b Account for Total Baseline Reductions on Unregulated Land

	POC	Required 5% Load Reductions	Baseline Loading Rate (*20)	Acres	Baseline Reduction
Unregulated Impervious	TN	0.07587000	1.51740000	0.01	0.02
Unregulated Pervious	TN	0.03021000	0.60420000	0.82	0.50
Unregulated Impervious	TP	0.01296000	0.25920000	0.01	0.00
Unregulated Pervious	TP	0.00148625	0.02972500	0.82	0.02
Unregulated Impervious	TSS	11.71320000	234.26400000	0.01	2.34
Unregulated Pervious	TSS	0.76912500	15.38250000	0.82	12.61

6c Calculate Total Load Reduction

Land Use	Pollutant	2009 EOS Loading Rate (lbs/acre/yr)	DA	Load	Efficiency	Initial Reduction	Baseline	Total Reduction	Sub-total/POC
Urban Impervious	Nitgrogen	16.86	27.24	459.27	11.00%	50.52	0.02	50.50	
Urban Pervious	Nitgrogen	10.07	33.29	335.23	11.00%	36.88	0.50	36.38	**92.74**
Forest	Nitgrogen	5.29	10.06	53.22	11.00%	5.85	0.00	5.85	
Urban Impervious	Phosphorus	1.62	27.24	44.13	36.00%	15.89	0.00	15.88	
Urban Pervious	Phosphorus	0.41	33.29	13.65	36.00%	4.91	0.02	4.89	**21.24**
Forest	Phosphorus	0.13	10.06	1.31	36.00%	0.47	0.00	0.47	
Urban Impervious	Total Suspended Solids	1,171.32	27.24	31,906.76	46.00%	14,677.11	2.34	14,674.77	
Urban Pervious	Total Suspended Solids	175.80	33.29	5,852.38	46.00%	2,692.10	12.61	2,679.48	**17,724.04**
Forest	Total Suspended Solids	79.91	10.06	803.89	46.00%	369.79	0.00	369.79	

7 Reduction Summary Table

Project Name	BMP Type	Lat	Long	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
SWM Facility #602	Wet Pond, L1	38.738575	-77.573661	92.74	21.24	17,724.04

Middle Dewey's 1 **Stream Restoration** **Status: Design**

3,903 **Crediting: Protocols Used**

1 Calculate POC Reductions

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
100% Load Reduction Estimates (lbs/yr)	1,038.0	346.0	349,708.0
Percent Efficiency		0.85	
Initial POC Reductions	**882.30**	**294.10**	**297,251.80**

<- Estimate to be updated after 1st monitoring yr

2 Characterize the Drainage Area

	Urban Impervious Acres	Urban Pervious Acres	Forested Acres	Total Urban Acres	Total Acres
PW Regulated Land	51.06	46.28	3.14	97.34	100.48
Other Regulated Land	22.53	6.26	8.64	28.79	37.43
Total Regulated Land	73.59	52.54	11.78	126.13	137.91
Total Unregulated Land	60.05	74.12	243.44	134.17	377.61
	133.64	**126.66**	**255.22**	**260.30**	**515.52**

3 Compute Ratios and Calculate Proportional Reductions by Land Use

	Regulated Area	Unregulated Area	Forested Acres	Total Credit
Ratio	**24.47%**	**26.03%**	**49.51%**	
TN (lbs) Reduction	215.87	229.63	436.80	**882.30**
TP (lbs) Reduction	71.96	76.54	145.60	**294.10**
TSS (lbs) Reduction	72,727.28	77,363.19	147,161.32	**297,251.80**

Total Check
100.00%

4 Account for Total Baseline Reductions on Unregulated Land

Urban Land Use	POC	Required 5% Load Reductions (lbs/acre/yr)	Baseline Loading Rate (*20)	Acres	Baseline Reduction (lbs/yr)
Impervious	TN	0.07587000	1.51740000	60.05	91.12
Pervious	TN	0.03021000	0.60420000	74.12	44.78
Impervious	TP	0.01296000	0.25920000	60.05	15.56
Pervious	TP	0.00148625	0.02972500	74.12	2.20
Impervious	TSS	11.71320000	234.26400000	60.05	14,067.55
Pervious	TSS	0.76912500	15.38250000	74.12	1,140.15

5 Calculate Total Reductions Minus Required Baseline

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
Credit for Unregulated Areas	229.63	76.54	77,363.19
Minus Unregulated Impervious Baseline	91.12	15.56	14,067.55
Minus Unregulated Pervious Baseline	44.78	2.20	1,140.15
Credit for Unregulated Areas	93.73	58.77	62,155.49
Credit for Regulated Areas	215.87	71.96	72,727.28
Credit for Forested Areas	436.80	145.60	147,161.32
Total Reductions Claimed	**746.40**	**276.33**	**282,044.10**

6 Reduction Summary Table

Project Name	BMP Type	Lat	Long	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
Middle Dewey's 1	Stream Restoration	38.57929005	-77.31506195	746.40	276.33	282,044.10

Upper Dewey's Phase 2 | **Stream Restoration** | **Status: Design**

3,084 | Used to be Upper Dewey's 1C | **Crediting: Protocols Used**

1 Calculate POC Reductions

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
100% Load Reduction Estimates (lbs/yr)	3,164.0	510.0	3,484,652.0
Percent Efficiency		0.85	
Initial POC Reductions	**2,689.40**	**433.50**	**2,961,954.20**

2 Characterize the Drainage Area

	Urban Impervious Acres	Urban Pervious Acres	Forested Acres	Total Urban Acres	Total Acres
PW Regulated Land	3.27	5.58	1.50	8.85	10.35
Other Regulated Land	0.00	0.00	0.00	0.00	0.00
Total Regulated Land	3.27	5.58	1.50	8.85	10.35
Total Unregulated Land	65.56	79.02	61.42	144.58	206.00
	68.83	**84.60**	**62.92**	**153.43**	**216.35**

3 Compute Ratios and Calculate Proportional Reductions by Land Use

	Regulated Area	Unregulated Area	Forested Acres	Total Credit	Total Check
Ratio	**4.09%**	**66.83%**	**29.08%**		100.00%
TN (lbs) Reduction	110.01	1,797.28	782.10	**2,689.40**	
TP (lbs) Reduction	17.73	289.70	126.07	**433.50**	
TSS (lbs) Reduction	121,164.32	1,979,427.94	861,361.94	**2,961,954.20**	

4 Account for Total Baseline Reductions on Unregulated Land

Urban Land Use	POC	Required 5% Load Reductions (lbs/acre/yr)	Baseline Loading Rate (*20)	Acres	Baseline Reduction (lbs/yr)
Impervious	TN	0.07587000	1.51740000	65.56	99.48
Pervious	TN	0.03021000	0.60420000	79.02	47.74
Impervious	TP	0.01296000	0.25920000	65.56	16.99
Pervious	TP	0.00148625	0.02972500	79.02	2.35
Impervious	TSS	11.71320000	234.26400000	65.56	15,358.35
Pervious	TSS	0.76912500	15.38250000	79.02	1,215.53

5 Calculate Total Reductions Minus Required Baseline

	Nitrogen (lbs/yr)	Phosphorous (lbs/yr)	TSS (lbs/yr) - Coastal
Credit for Unregulated Areas	1,797.28	289.70	1,979,427.94
Minus Unregulated Impervious Baseline	99.48	16.99	15,358.35
Minus Unregulated Pervious Baseline	47.74	2.35	1,215.53
Credit for Unregulated Areas	1,650.06	270.36	1,962,854.07
Credit for Regulated Areas	110.01	17.73	121,164.32
Credit for Forested Areas	782.10	126.07	861,361.94
Total Reductions Claimed	**2,542.18**	**414.16**	**2,945,380.33**

6 Reduction Summary Table

Project Name	BMP Type	Lat	Long	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
Upper Dewey's Phase 2	Stream Restoration	38.5861784	-77.3265312	2,542.18	414.16	2,945,380.33

Appendix E – Estimated Project Implementation Costs

Project Status	Project Name	Project Type	Implementation FY	Cost
Phase III Planned	Upper Dewey's Phase 1	Stream	2027	$9,957,400
	Upper Dewey's Phase 2 (1C)	Stream	2028	$5,034,400
	SWM Facility #416 Retrofit	Retrofit	2027	$850,000
	Lake Drive Stream Restoration	Stream	2027	$850,000
	SWM Facility #602 Retrofit	Retrofit	2027	$890,000
	Middle Dewey's Phase 1	Stream	2027	$6,244,800
	Total			**$23,826,600**

Appendix F – Public Comments

Reserved for public comments on the final Phase III Action Plan.

At the time of submittal, no public comments for Chesapeake Bay Phase III Action Plan have been received.